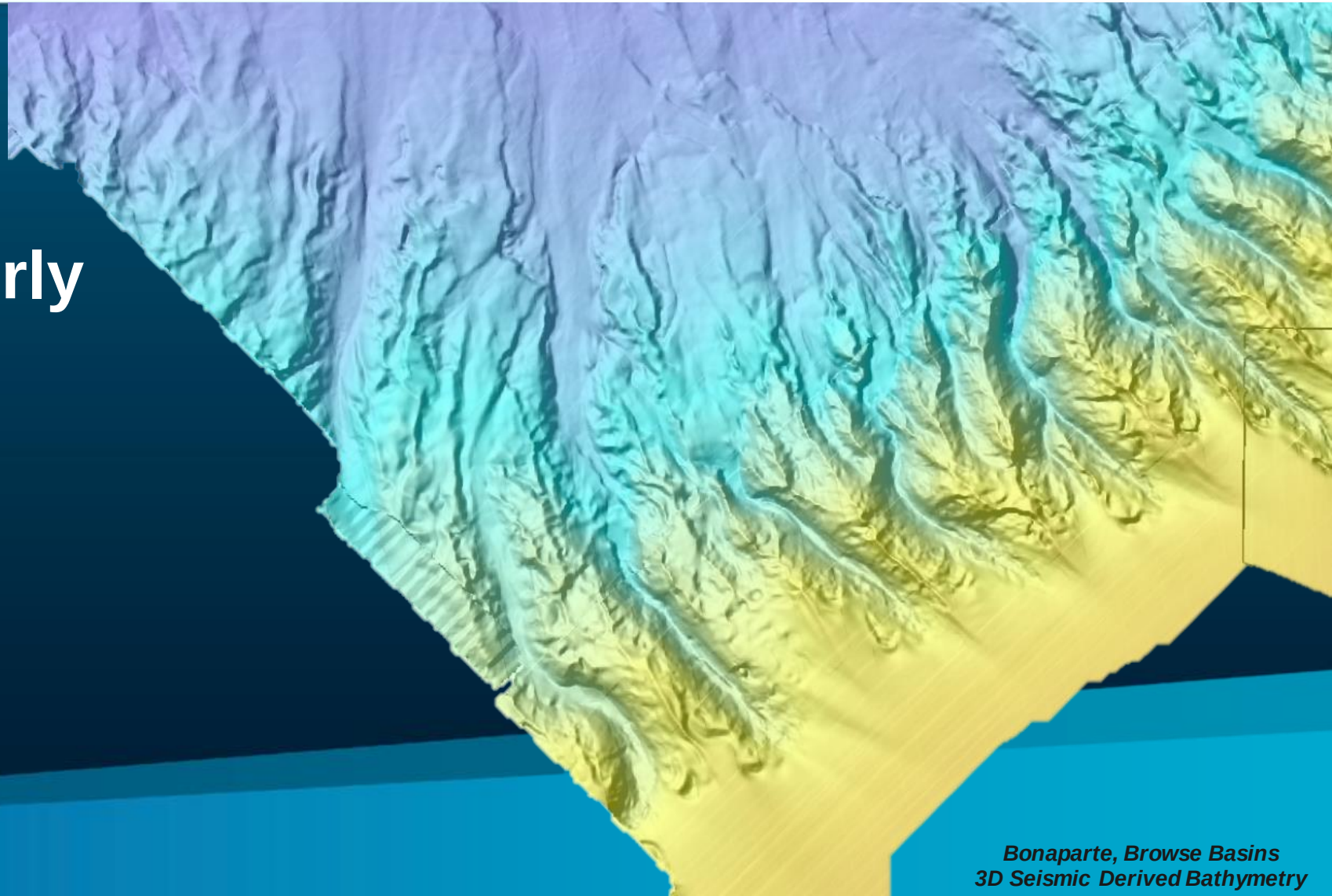
AusSeabed Quarterly Showcase

April – June 2023

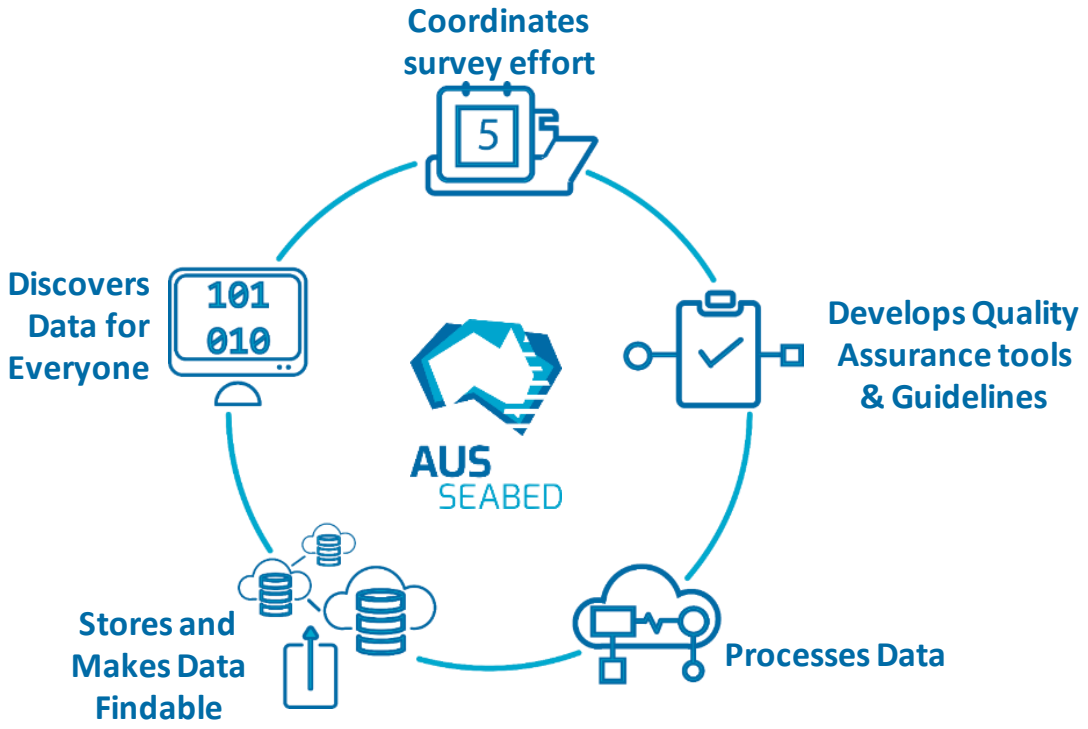
20 July 2023



Bonaparte, Browse Basins
3D Seismic Derived Bathymetry

Agenda

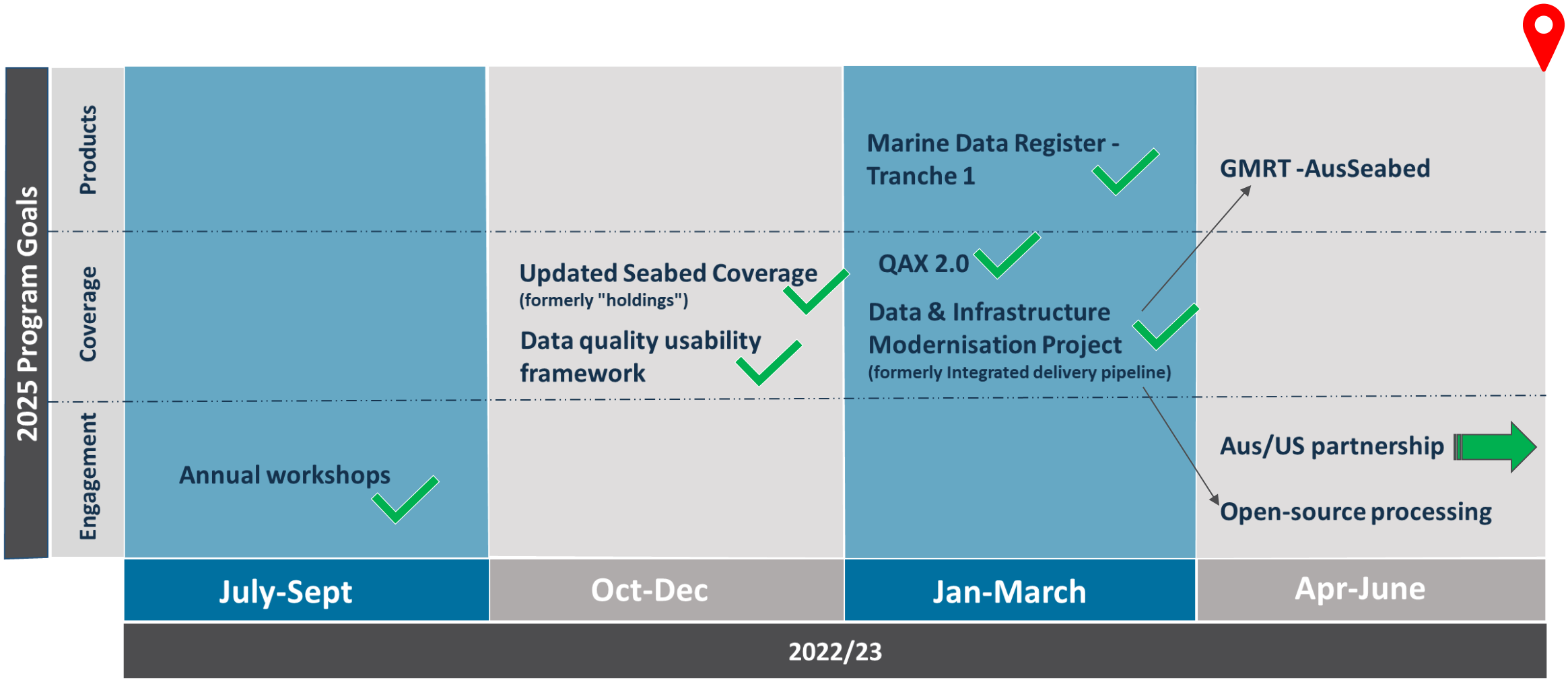
1. Introduction and welcome
2. Increment Overview
3. Data Acquisition (NSW)
4. New Dynamic Coverage Services
5. Published Datasets
6. WA Data Access Portal
7. QAX 2.0
8. Geomorphology 2 Part Scheme
9. Aus/US MoU - Wiki
10. AMSA Symposium Update
11. AusSeabed Steering Committee Election
12. Workplan 23-24
13. Next Quarter



Increment Overview

Natalie Lennard,

Geoscience Australia


2025 Program Goals
Products
Coverage
Engagement
Marine Data Register - Tranche 1
GMRT -AusSeabed
QAX 2.0
Updated Seabed Coverage
(formerly "holdings")
Data & Infrastructure Modernisation Project
(formerly Integrated delivery pipeline)
Data quality usability framework
Aus/US partnership
Open-source processing
Annual workshops
July-Sept
Oct-Dec
Jan-March
Apr-June
2022/23

Data Acquisition

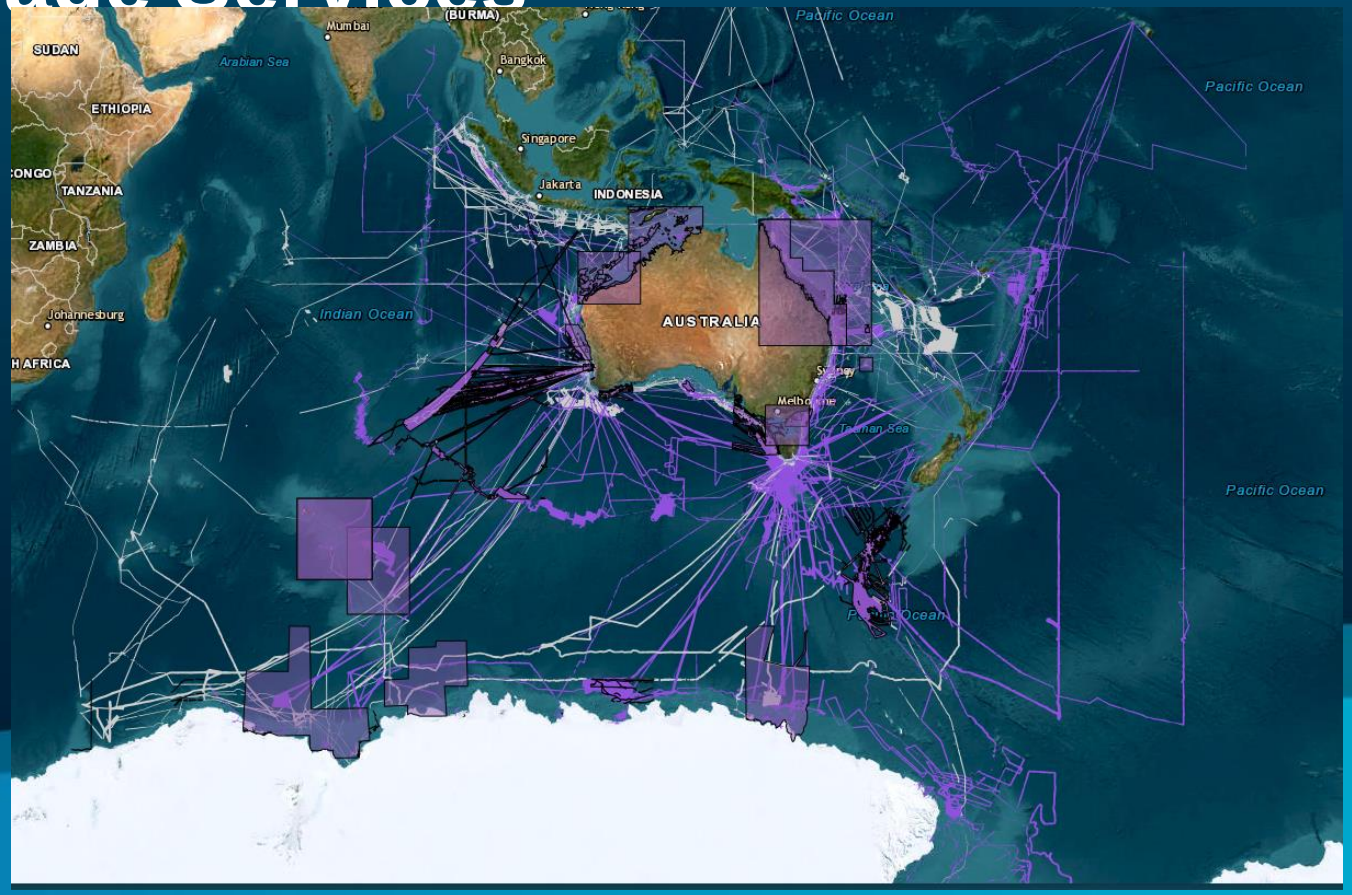
Tim Ingleton,

NSW Department of Planning, Industry and Environment

New Dynamic Coverage Services

Neal E, Michal W & Quynh P

Geoscience Australia

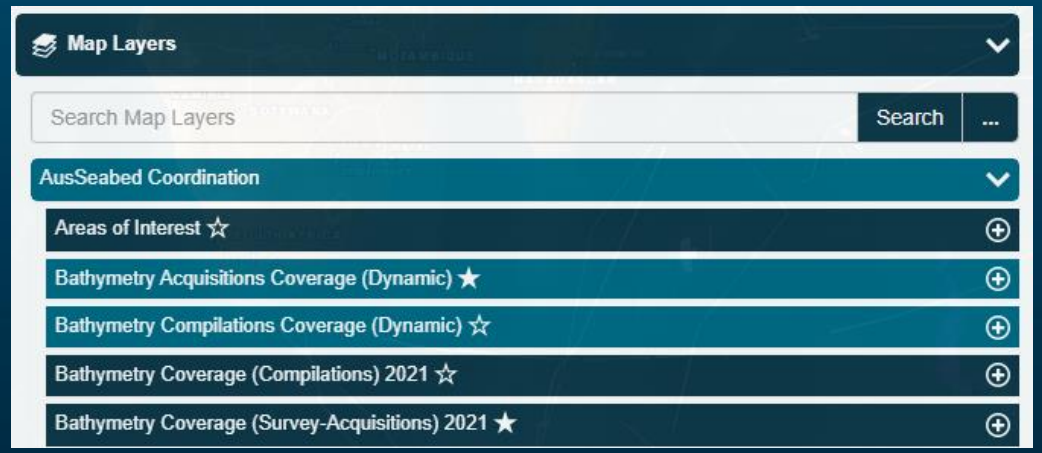


New Dynamic Coverage Services

- What

These Coverages represent an update to the knowledge of bathymetry data and a change from a snapshot version to dynamic layers. As data is received or published the coverages are updated and then each night the Portal is refreshed.

The new Layers can be found in the Portal under the AusSeabed Coordination menu:



Title 2021 version	New Title
AusSeabed Bathymetry Holdings (by survey)	Bathymetry Coverage (Survey-Acquisitions) 2021
AusSeabed Bathymetry Holdings (compilations)	Bathymetry Coverage (Compilations) 2021

New Dynamic Layers
Bathymetry Acquisitions Coverage (Dynamic)
Bathymetry Compilations Coverage (Dynamic)

New Dynamic Coverage Services

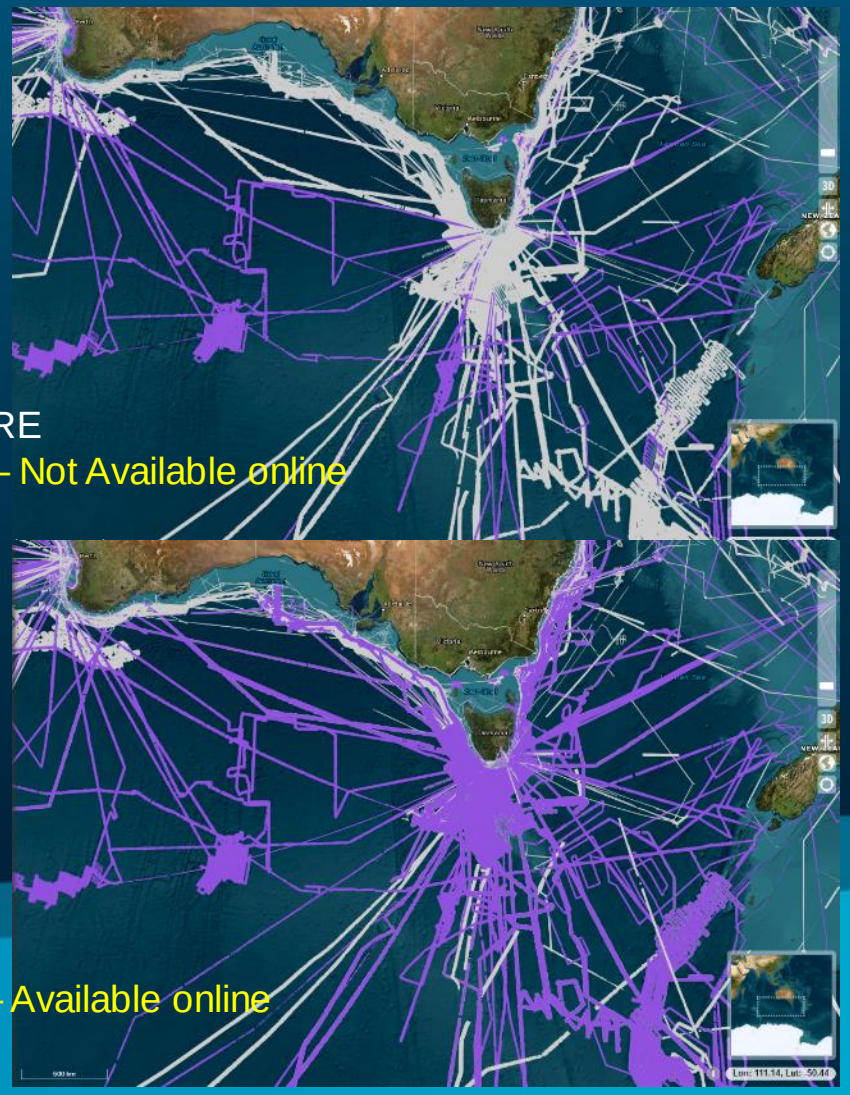
- Why – to improve the overall data management practices (process improvements) of the AusSeabed team and to provide a faster turn-around to the marine community increasing data availability knowledge.
- Progress/Status
  - 90% of existing polygons simplified (maintaining area) to improve performance and visualisation
  - Existing attributes cleaned and missing attributes updated
  - Additional attributes added, population of these where it was simple to gather
  - Additional Layers collected from WA DoT, Gold Coast LiDAR, CSIRO and all products published to end of May 2023 included.
  - Published version on the Portal – With nightly updates as data becomes available

New Dynamic Coverage Services

- New Features
  - Dynamic updates
  - Backups/Disaster recovery
  - Additional Data
  - Additional Attributes
  - Additional Filters
  - Updated Styles

New Dynamic Coverage Services

- New Features
  - Additional Data (>300 new records)
    - WA DoT
    - Gold Coast LiDAR
    - CSIRO and
    - all products by the GA ASB Hub published since the end of 2021
  - Additional data now available online



BEFORE
White – Not Available online

AFTER
Purple – Available online

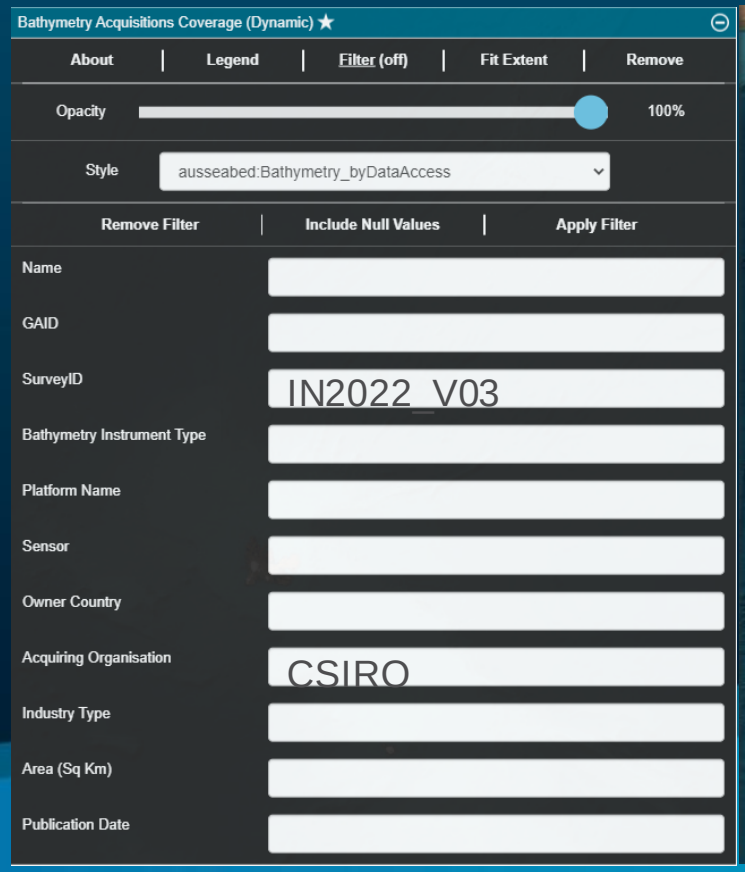
New Dynamic Coverage Services

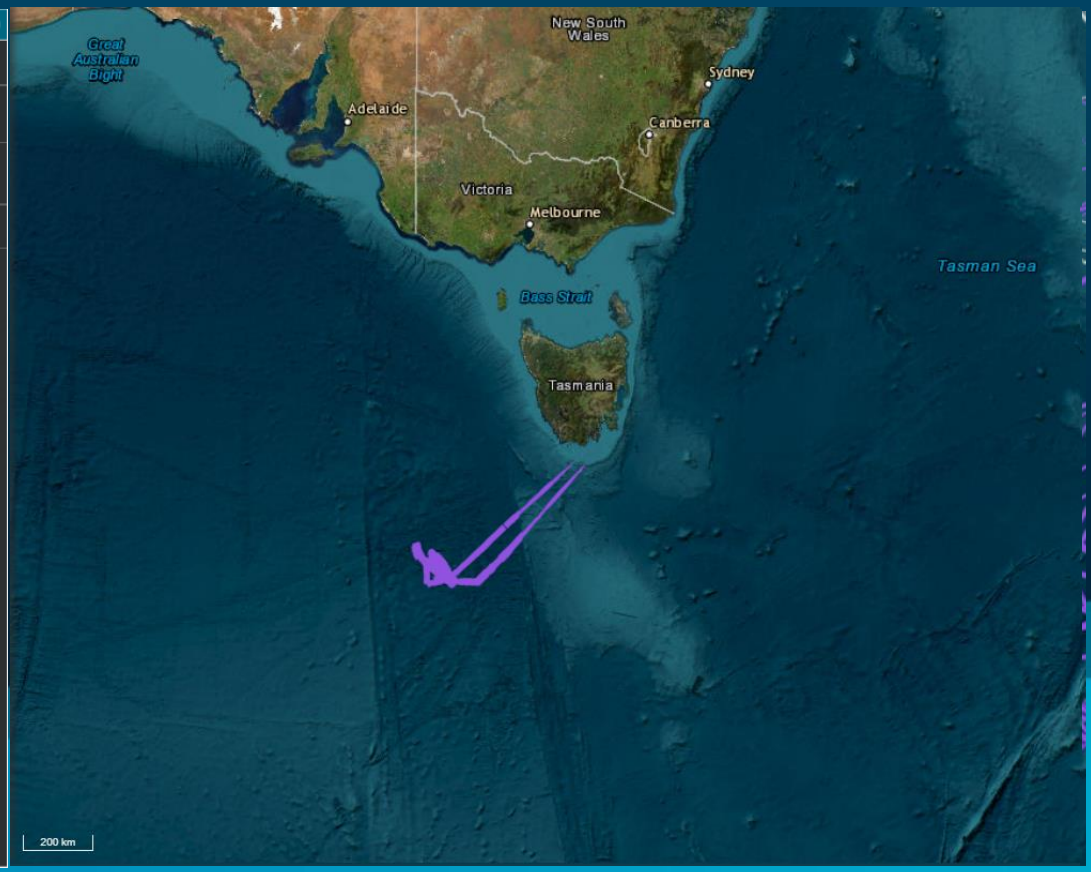
- New Features
  - Additional Attributes

OGC_ID	893
NAME	Tasman and Coral Sea
GAID	4868
NEWGAID	20200017S
SURVEYID	FK201228
PUBLISHED_DATE	2021-04-09
PLATFORM_NAME	RV Falkor
BATHY_TYPE	Multibeam
SENSOR	Kongsberg EM302 and EM710
COLLECTING_ORGANISATION	JCU/UQ
PRINCIPAL_INVESTIGATOR	Dr Robin Beaman JCU
OWNER_COUNTRY	Australia
START_DATE	2020-12-28
END_DATE	2021-01-25
START_LOCATION	Brisbane
END_LOCATION	Brisbane
AREA_KM2	40285.48
BATHY_URL	http://pid.geoscience.gov.au/dataset/ga/145279
BKSCT_URL	N/A
L3_GRIDDED_ASB	Yes
EMBARGO	N/A
SOURCE	Research

New Dynamic Coverage Services

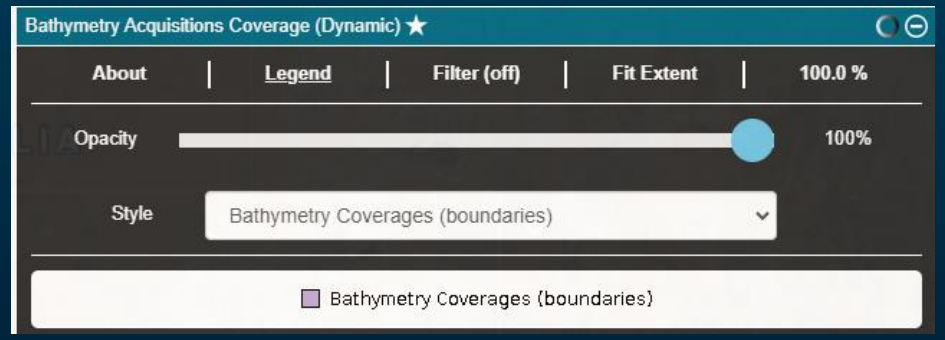
- New Features
  - Additional Filters

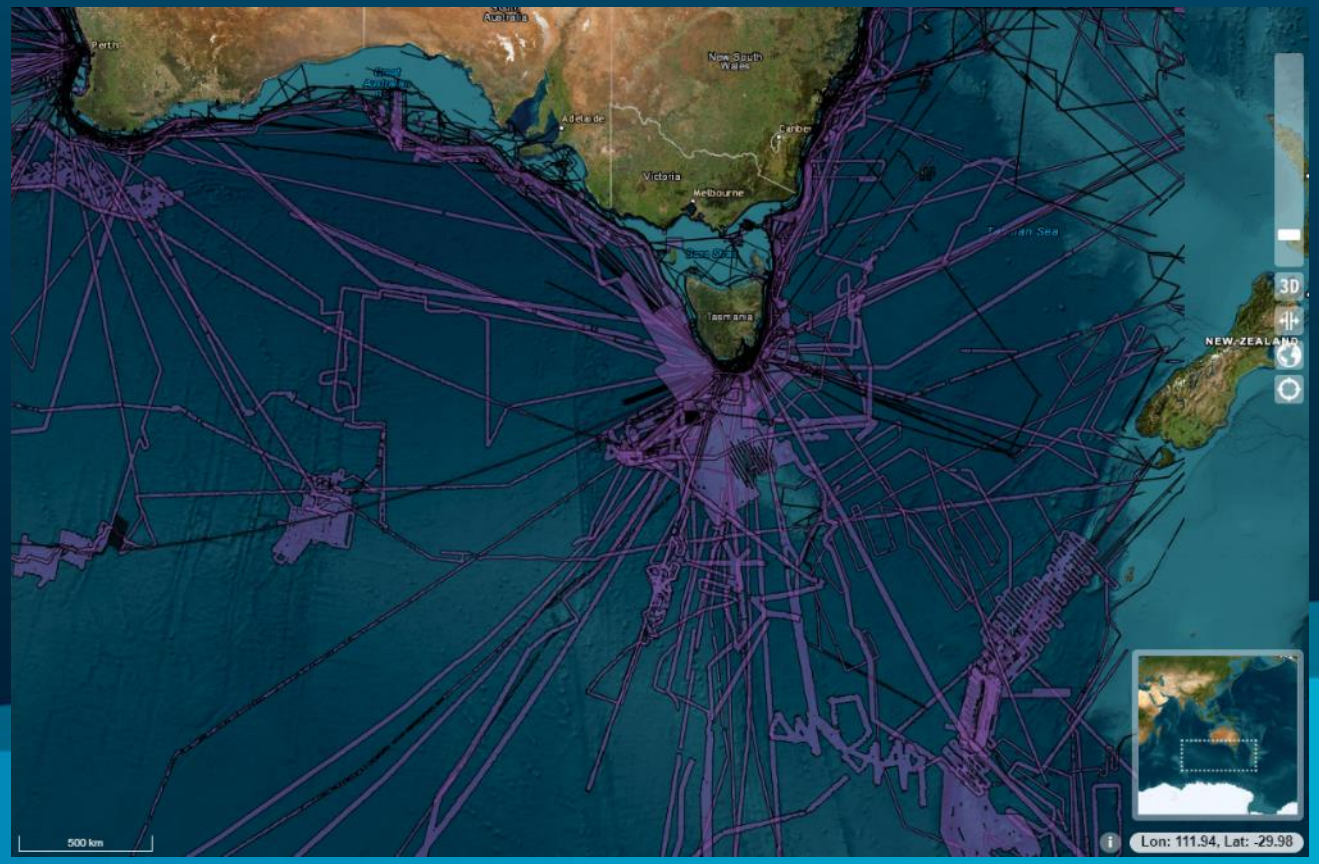




New Dynamic Coverage Services

- New Features
  - Updated Styles





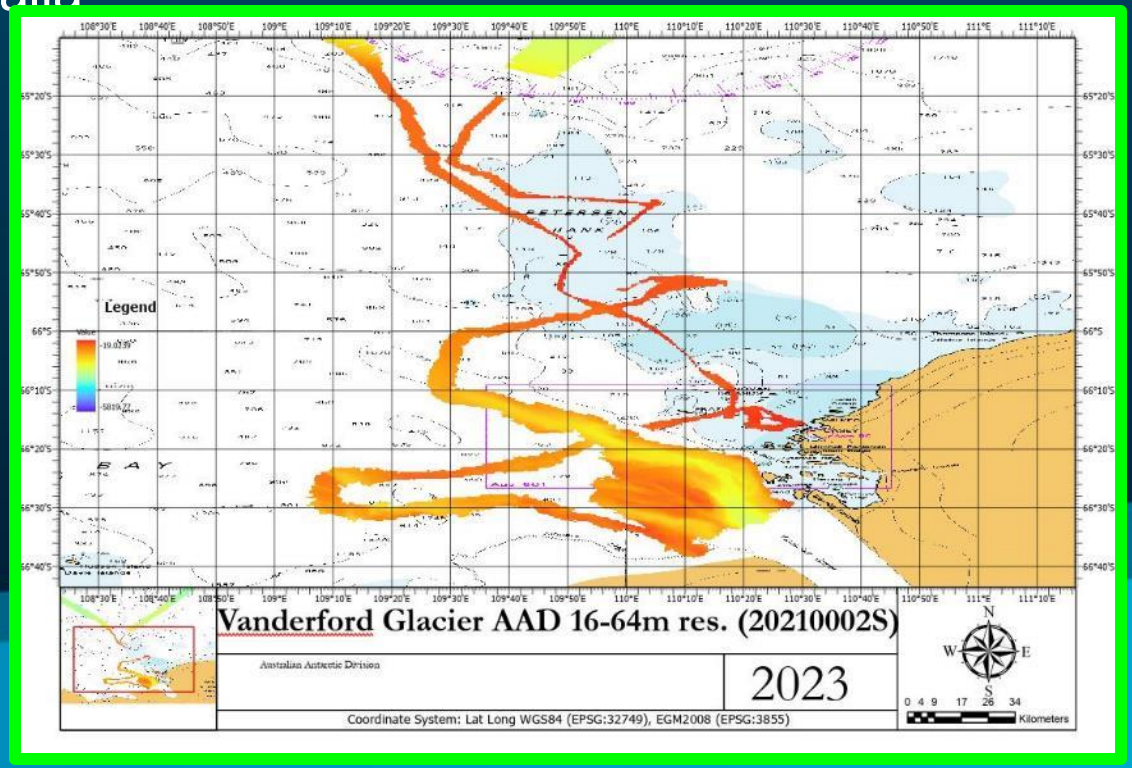
New Dynamic Coverage Services

- What's Next
  - Populate Additional Attributes
  - Determine what else is required to assist in developing What is Mapped statistics

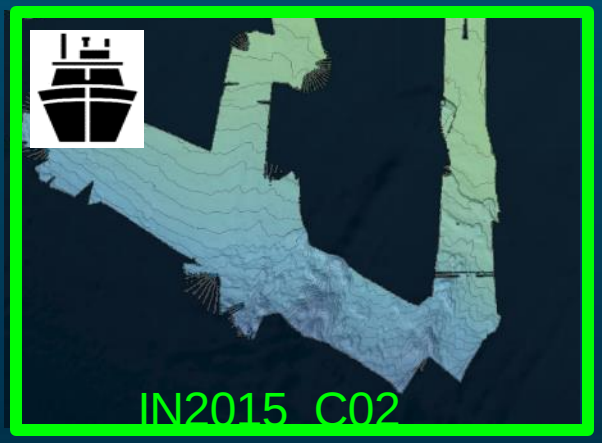
- Lessons Learned
  - Always plan for complexity
  - Can't always plan for resource changes
  - Plan a stretch task – we changed the delivery from another annual update to dynamic services

5. Published Datasets

Ops, Noise Suppressors, Geoscience Australia

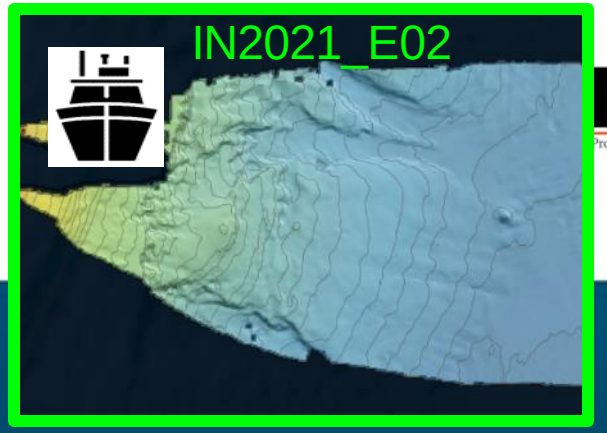


What's published?



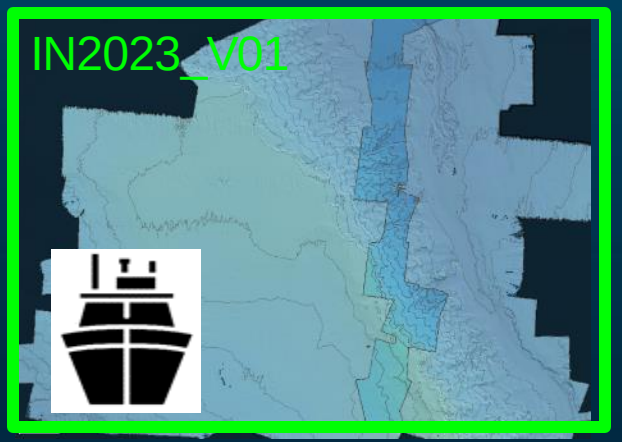
Great Australian Bite
Area ~2, 250 km²

Huon Marine Park
Area ~2, 250 km²



Freycinet Marine Park
Area ~4, 433 km²

Macquarie Ridge Complex
Area ~18 887 km²



Cape Darnely, East Antarctica
Area ~188 251 km²

Research & Management

Fishing

Infrastructure

Energy

Tourism

Defence

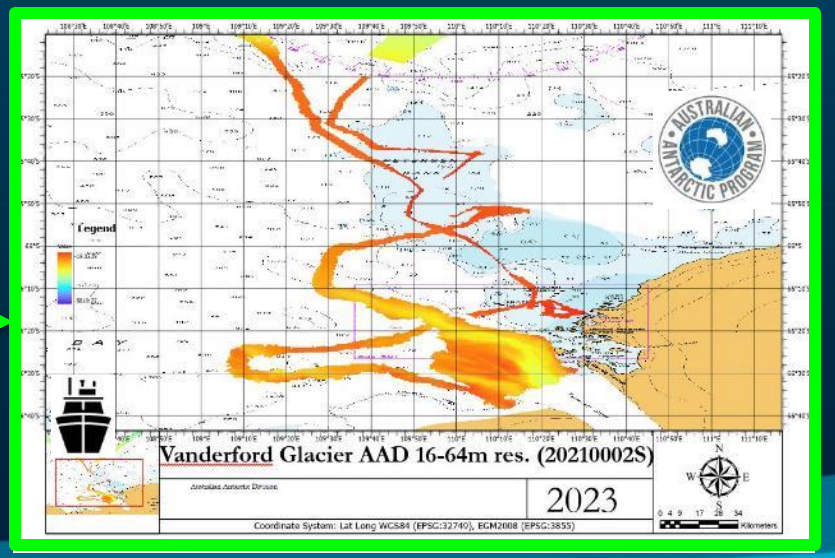
What's next?

1st Survey Published

Published

Label on AusSeabed Marine Data Portal	Institute
Tasman Sea Bathymetry 16m - 64m (CSIRO) ss200611	CSIRO
Antarctic Bathymetry 5m - 210m (CSIRO) in2019_v01 - multi-resolution	CSIRO
Vanderford Glacier Bathymetry	AAD
Great Australian Bight 10m - 210m (CSIRO) in2015_c01 - multi-resolution	CSIRO
Great Australian Bight 10m - 210m (CSIRO) in2015_c02 - multi-resolution	CSIRO
Southern Ocean 10m - 210m (CSIRO) in2015_e01 - multi-resolution	CSIRO
Huon Marine Park Bathymetry 5m-210m (CSIRO) in2015_e02 - multi-resolution	CSIRO
South-Eastern Tasmania 10m - 210m (CSIRO) in2015_e03 - multi-resolution	CSIRO
South-Eastern Tasmania 10m - 210m (CSIRO) in2015_e04 - multi-resolution	CSIRO
Freycinet Marine Park Bathymetry 10m - 210m (CSIRO) in2015_e05	CSIRO
Storm Bay 5m - 210m (CSIRO) in2021_e01 - multi-resoluti	CSIRO
Freycinet Marine Park Bathymetry 5m - 210m (CS	CSIRO
South-East Tasmania 5m - 210m (CSIR	CSIRO
South-East Tasmania 5m - 21	CSIRO
Southern Ocean 5	CSIRO
Macquari	WA
Sout	RO
Hoba	CSIRO
Sydney	CSIRO
Southern	olution CSIRO
East Aust	multi-resolution CSIRO
East Austra	2015_v03 - multi-resolution CSIRO
East Tasma	RO) in2016_e01 - multi-resolution CSIRO
Sydney to Ho	(CSIRO) in2016_e02 - multi-resolution CSIRO
Fiji to Hobart T	y 10m - 210m (CSIRO) in2016_t01 - multi-resolution CSIRO
Hobart to Sydne	nsit Bathymetry 10m - 210m (CSIRO) in2016_t02 - multi-resolution CSIRO
Australian Eastern Continental Margin Bathymetry 10m - 210m (CSIRO) in2017_v03 - multi-resolution	CSIRO
Hobart to Brisbane Transit Bathymetry 10m - 210m (CSIRO) in2018_t01 - multi-resolution	CSIRO
Brisbane to Hobart Transit Bathymetry 10m - 210m (CSIRO) in2018_t02 - multi-resolution	CSIRO
East Australian Current Bathymetry 10m - 210m (CSIRO) in2018_v04 - multi-resolution	CSIRO
East Australian Current IMOS Bathymetry 10m - 210m (CSIRO) in2022_v06 - multi-resolution	CSIRO
Cape Darnley East Antarctica Bathymetry 10m - 210m (CSIRO) in2023_v01 - multi-resolution	CSIRO
Tasman Sea Margin Bathymetry 10m - 210m (CSIRO) in2022_v05 - multi-resolution	CSIRO
Heard and Macdonald Islands Bathymetry 10m - 210m (CSIRO) in2016_v01 - multi-resolution	CSIRO
Indian Ocean Territories Seamount Bathymetry 10m - 210m (CSIRO) in2022_v08 - multi-resolution	CSIRO
Southern Ocean Time Series Bathymetry 10m - 210m (CSIRO) in2019_v02 - multi-resolution	CSIRO
Indian Ocean Bathymetry 10m - 210m (CSIRO) in2019_v03 - multi-resolution	CSIRO

Total of 37 bathymetry products
- 26 New surveys
- 11 Revised
- Multi-res - (New Capability)
- 1 AAD (New Contributor)



Total: ~1, 440, 561 km²

(~18% area of Australia)

What's next?

Queued

Releasing Entity	Label on AusSeabed Marine Data Portal	Vessel
AHO	Western approaches to Torres Strait, QLD 2020 30m	MV Pacific Conquest; VH-VEH Cessna 441;USV
AHO	Gulf St Vincent (North), SA 2020 30m	MV Pacific Conquest, USV
AHO	Backstairs Passage, SA 2021 30m	MV Ocean Dynasty
AHO	Camden Sound (North-West) WA 2022 30m	MV Ocean Dynasty; MV Empress
AHO	Banks Strait to Cape Barren, TAS 2022 30m	MV Offshore Solution; SMB Indigo
AHO	Cape Barren to Babel Island, TAS 2021 30m	MV Ocean Dynasty; MV Pacific Crest
AHO	Flinders Island NE, TAS 2021 30m	MV Offshore Surveyor
UWA	Otway, Gippsland Basins and Bass Strait Bathymetry 2022 30m	Various
Ocean Infinity	Norfolk Island Nearshore and Coastal Habitat Mapping AU420 Bathymetry 2021 1m	M/V Offshore Solution
AHO	Approaches to Darwin, Beagle Gulf (HIPP SI 1002) Bathymetry 2020 30m	SV Limitless and PHS Zephyr
AHO	Mavis Reef (East), Bonaparte Archipelago (HIPP SI 1011) Bathymetry 2020 30m	MV Warrego
CSIRO	SE Tasmania (CSIRO) (SS01/2008)	Southern Surveyor
GA	Austrea 1 Bathymetry 1999 100m	L'Atalante
CSIRO	Tasmanian Seamounts 2 (CSIRO) (SS02/2007)	Southern Surveyor

Strengthened ties between CSIRO and GA through collaborative innovation

- Developing multi-resolution capability provided opportunity to learn from each other
- Better understanding each others processes has enhanced co-ordination
- Efficient upgrade to new dynamic update system (minimal disruption to services)

https://portal.ga.gov.au/persona/marine

WA Data Access Portal

Ralph Talbot-Smith,

Western Australia Department of Transport

QAX 2.0

Lachlan Hurst,

FrontierSI

QAX 2.0 Focus

Identify and address issues preventing the adoption of QAX for bathymetry quality assurance checks.

Establish working group to support development of roadmap, prioritisation, and provide domain expertise.

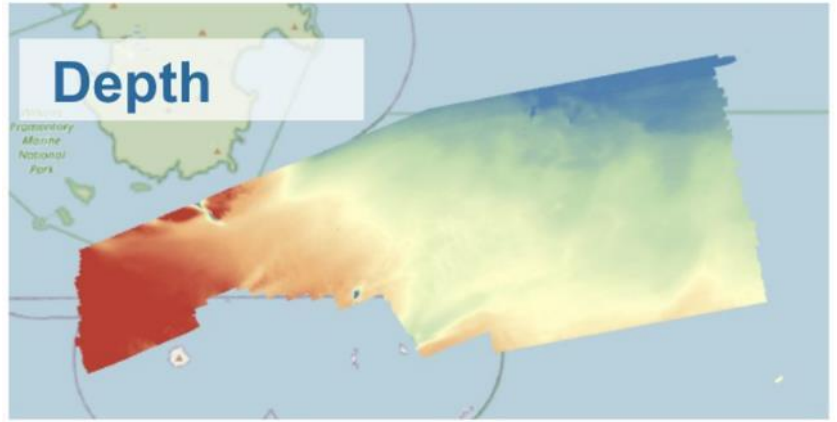
Engage broader bathymetry community.

Gridded Input Files

Issue 1: QAX **required input files to be translated** into 3 band GeoTIFFs, with bands in a specific order

Issue 2: QAX **required all three bands** to run any check

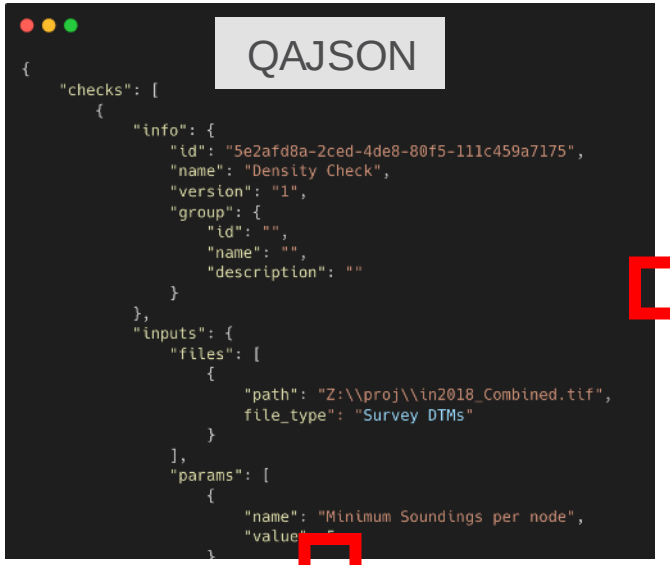
QAX now supports single and 3 band GeoTIFFs. Specific ordering is not required, but naming conventions must be adhered to. Checks no longer require all 3 bands.

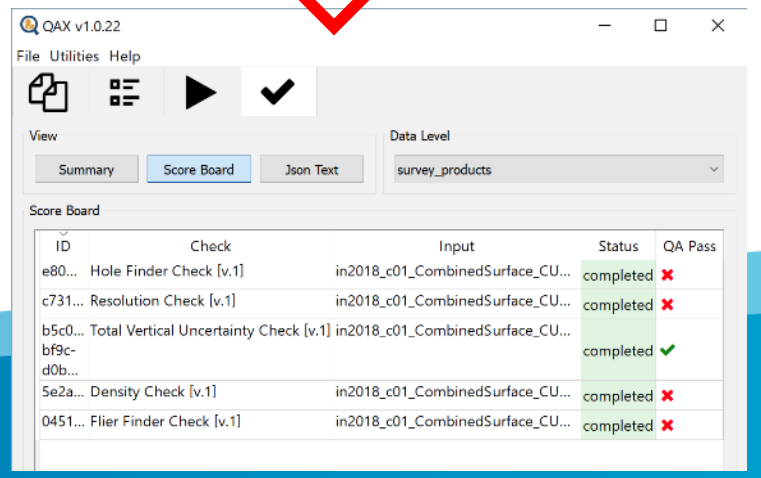


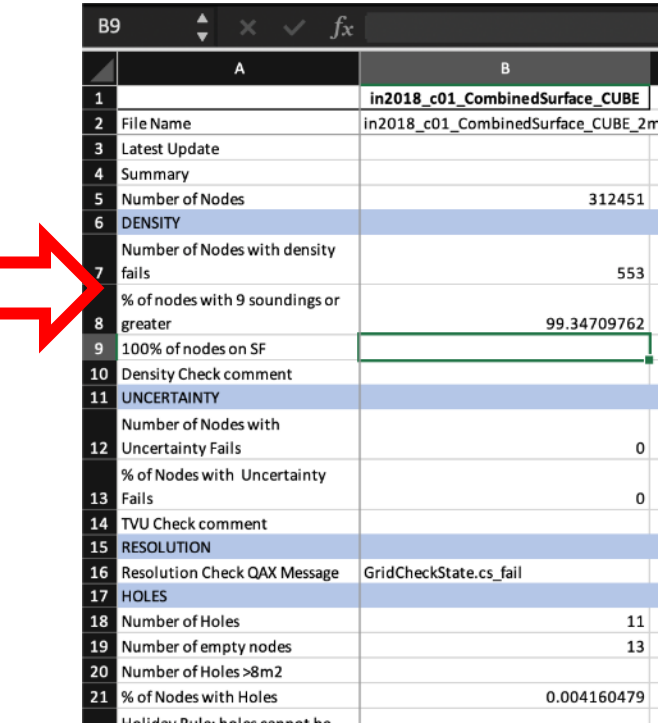
Report Outputs

Issue: No easy way to export QAX result summary information

QAJSON generated by QAX can now be saved to an Excel worksheet.







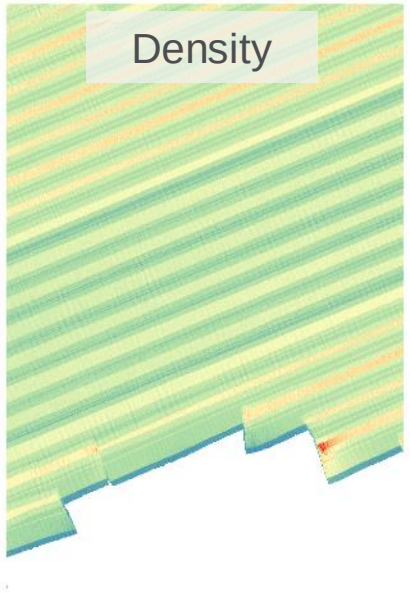
	A	B
1		in2018_c01_CombinedSurface_CUBE
2	File Name	in2018_c01_CombinedSurface_CUBE_2m
3	Latest Update	
4	Summary	
5	Number of Nodes	312451
6	DENSITY	
7	Number of Nodes with density fails	553
8	% of nodes with 9 soundings or greater	99.34709762
9	100% of nodes on SF	
10	Density Check comment	
11	UNCERTAINTY	
12	Number of Nodes with Uncertainty Fails	0
13	% of Nodes with Uncertainty Fails	0
14	TVU Check comment	
15	RESOLUTION	
16	Resolution Check QAX Message	GridCheckState.cs_fail
17	HOLES	
18	Number of Holes	11
19	Number of empty nodes	13
20	Number of Holes >8m2	
21	% of Nodes with Holes	0.004160479

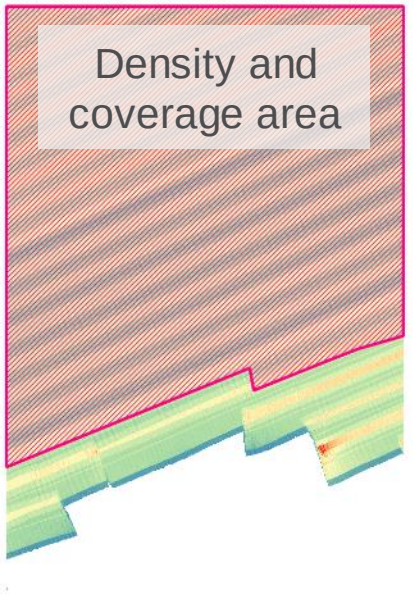
Coverage Area

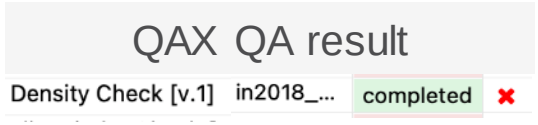
Issue: QAX would often fail datasets due to low density and/or holes around edges of dataset

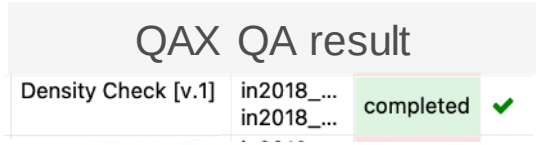
A coverage area can now be specified within QAX. QA checks are only run on the data within this coverage area.

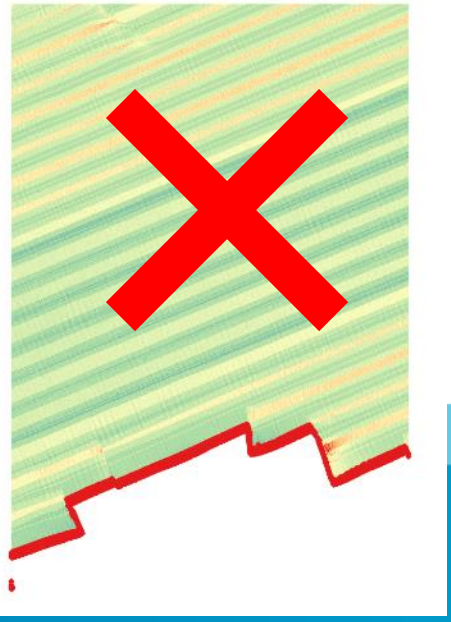
Bonus: use a coverage area to run QA over small problematic areas of large datasets





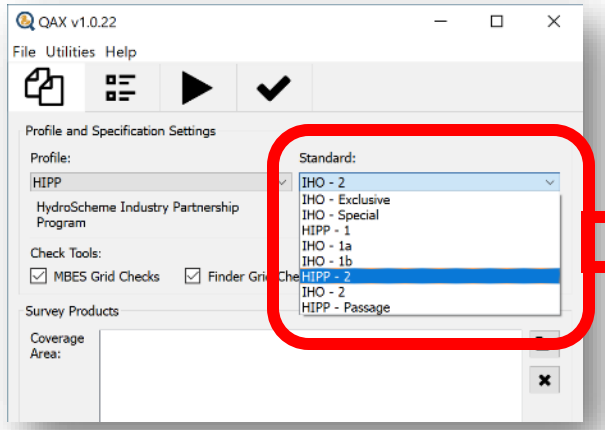


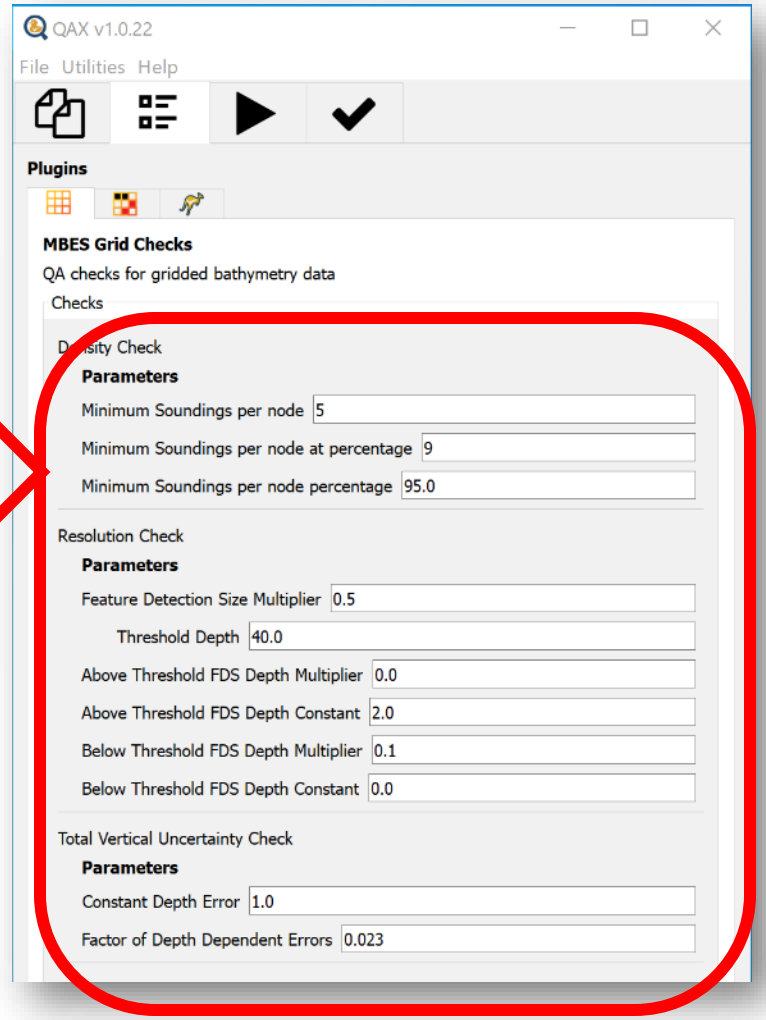




Common Standard Defaults

Issue: user must provide a series of parameters to each check that are generally taken from common standards.



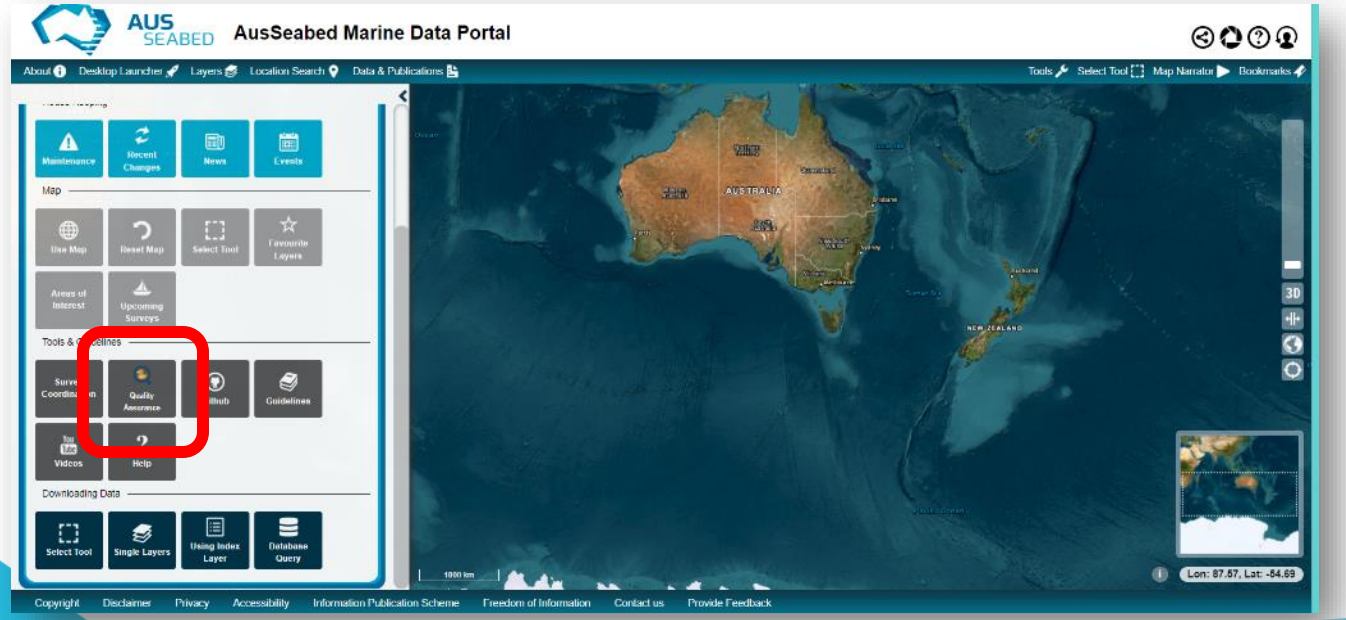


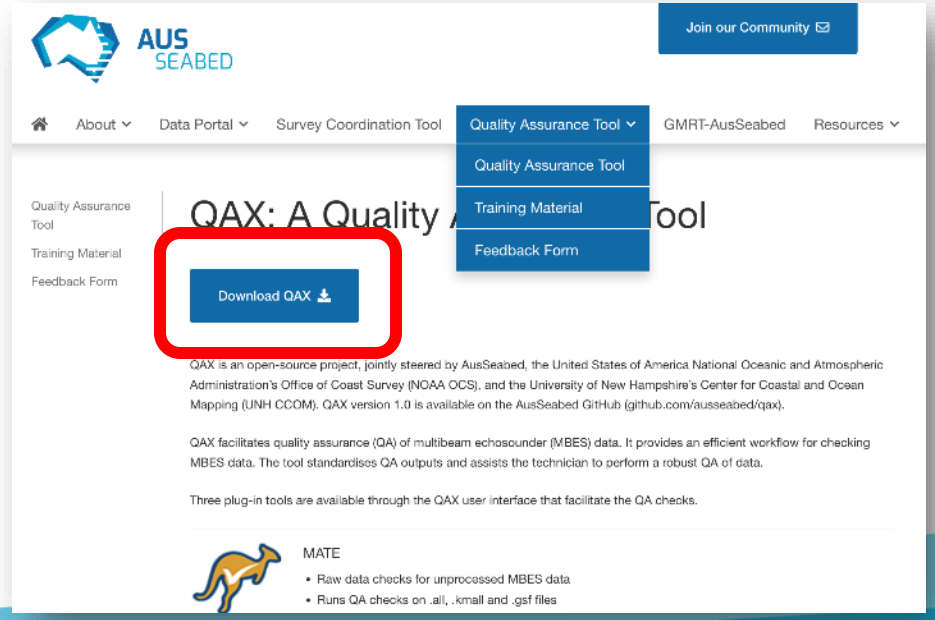
Users can now select from a list of common standards, selecting a standard will populate the default check input parameter values.

Release

Available now

https://github.com/ausseabed/qax/releases





Working Group

Charles Collins - EGS Survey

Ian Phillips - Australian Hydrographic Office

Justy Siwabessy - Geoscience Australia

Paul Kennedy - Guardian Geomatics

What's Next

Expanded working group

Developing list of potential QAX 3.0 features

Diversification of QAX development team

Develop support plan

Contact

ausseabed@ga.gov.au

Geomorphology 2-Part Scheme

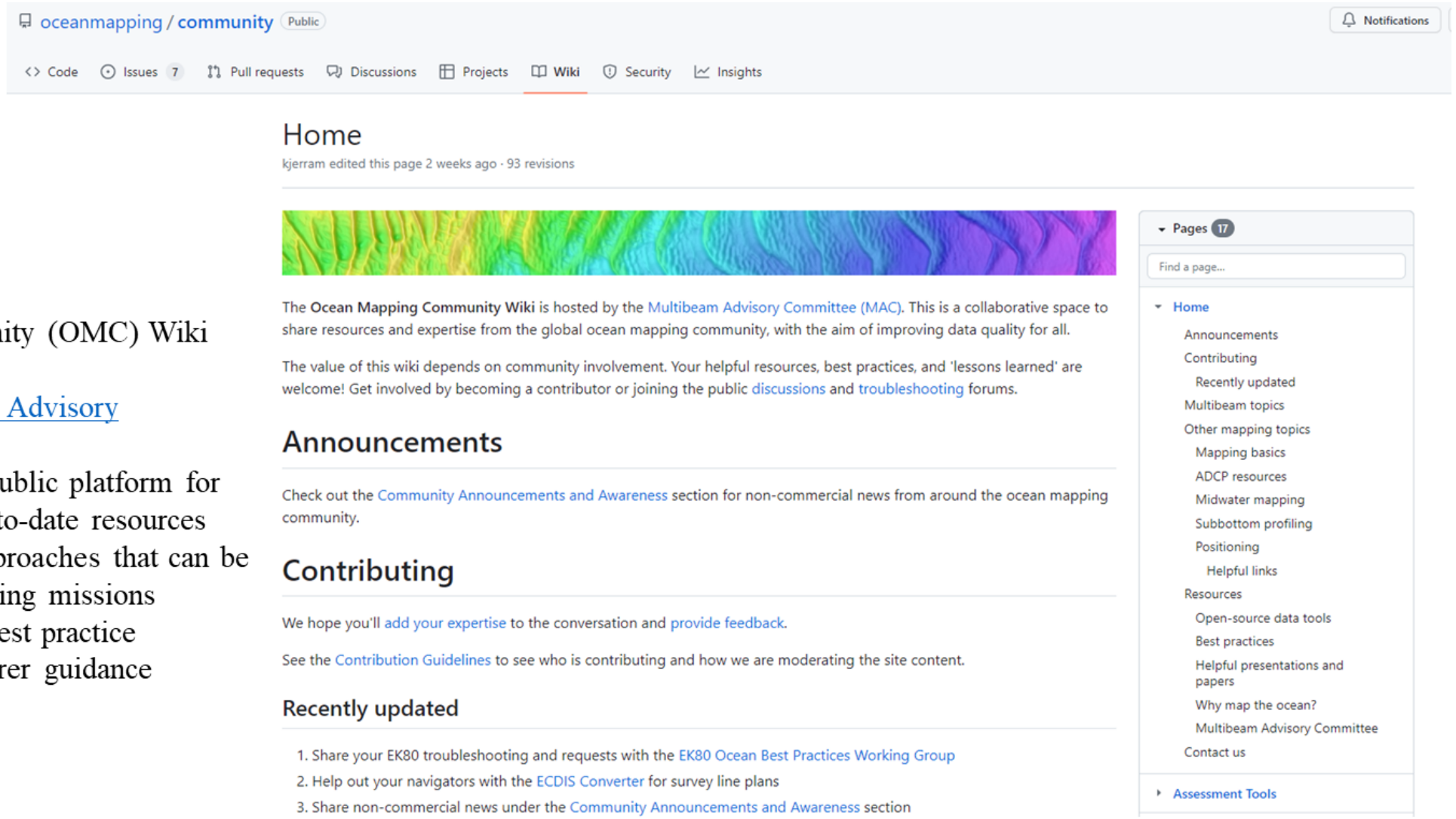
Rachel Nanson,

Geoscience Australia

Aus/US - Ocean Mapping Wiki

Emma Hickerson, Geoscience Australia

- Ocean Mapping Community (OMC) Wiki released in 2022
- Hosted by the Multibeam Advisory Committee.
- Centralized, living, and public platform for highlighting new and up-to-date resources
- Examples of common approaches that can be adapted for various mapping missions
- Not intended to replace best practice repositories or manufacturer guidance



Home · oceanmapping/community Wiki · GitHub

Data Acquisition

ejheffron edited this page on Jun 10 · 16 revisions

Resources for planning and conducting a multibeam survey.

Add / modify topics as needed. This page is not going to be a one-size-fits-all SOP, as platforms, systems, and survey requirements vary wildly. These resources may be split into different pages as they grow.

See Transit Mapping for optimizing mapping opportunities on transits.

Planning

Where do you want to survey?

Finding existing data

Links to data repositories and planning resources

1. GMRT resources - only processed data is published to this grid; GMRT includes much more than bathymetry
2. GMRT Map Tool - select subsets of GMRT data for download in a variety of formats
3. GEBCO - download grids with or without satellite altimetry mask
4. Seabed2030 - a global effort to map the seafloor in high resolution
5. IHO Data Centre for Digital Bathymetry - find out where industry and other non-public data exists
6. NCEI Bathymetry Viewer - most of the data in this mosaic is not processed - user beware
7. EMODnet Bathymetry - European data portal, including access requests for non-public data
8. AusSeabed Data Portal - Australian marine data resources, including national compilations and regional surveys
9. SCUFN - find a seafloor feature name, or submit a name for a new seafloor feature!

Planning surveys

1. NOAA Tides & Currents -
2. SmartMap - sound speed forecasting and line planning web service
3. UNH Map Portal - web map apps for CCOM-related data products; also available to integrate with ESRI Arc Pro/Online
4. AusSeabed Survey Coordination - identify areas of interest and coordinate survey plans within Australian waters

Data Acquisition

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6. NCEI Bathymetry Viewer - most of the data in this mosaic is not processed - user beware
7. EMODnet Bathymetry - European data portal, including access requests for non-public data
8. AusSeabed Data Portal - Australian marine data resources, including national compilations and regional surveys
9. SCUFN - find a seafloor feature name, or submit a name for a new seafloor feature!

Planning surveys

1. NOAA Tides & Currents -
2. SmartMap - sound speed forecasting and line planning web service
3. UNH Map Portal - web map apps for CCOM-related data products; also available to integrate with ESRI Arc Pro/Online
4. AusSeabed Survey Coordination - identify areas of interest and coordinate survey plans within Australian waters

- QPS Qimera - commonly used by the UNOLS fleet and ocean exploration programs; full capability for expert users with simple processing paths for non-experts (e.g., new watchstanders, interns)
- Saber - not as commonly used outside Leidos
- SonarScope - Matlab-based multibeam processing package from IFREMER

QA/QC software

Software for checking multibeam data quality and completeness from acquisition and through final surfaces.

- QAX - a joint project between AusSeabed, NOAA, and CCOM (see project on GitHub)

Seafloor characterization

Software for characterizing and/or classifying seafloor by morphology, backscatter, and other parameters. These options expand upon built-in tools available in some multibeam data processing packages listed above.

- Seabed Geomorphology Tools - Python tools for classifying seabed based on shape, backscatter, sub-bottom/seismic, and other data

Data archive

Data submission to an archive or repository depends on the pre-mission agreement between the various organizations involved. It is strongly recommended to have a pre-determined data management plan so that these details are well known before the vessel/vehicle return to port.

In general, raw data should be submitted to NCEI. Processed grids to be incorporated into the GEBCO grid can be submitted through the GEBCO site.

Clone this wiki locally

https://github.com/oceanmapping/co

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Best practices

1. Ocean Best Practices - a repository for ocean science SOPs from around the world
2. IHO-IO GEBCO Cookbook - a technical reference manual focused on how to build grids
3. NOAA OER Deepwater Exploration Mapping - a reference for NOAA OER mapping operations on the NOAA Ship *Okeanos Explorer*
4. Australian Multibeam Guidelines - a technical reference manual focused on multibeam operations

Helpful presentations and papers

1. Sonar Synchronization and Tradeoffs
2. Rolling Deck to Repository Overview - 2020 RVTEC
3. Open Vessel Data Management - 2020 RVTEC
4. Lessons Learned from a Successful Integration of the EM 304 MKII Variant Multibeam Sonar
5. Ocean Exploration in a Data-Rich World - white paper from 2022 National Ocean Exploration Forum
6. Exploring the use of Sound Speed Profiles... - 2022 Ocean Sciences
7. Calibration of Acoustic Instruments - Summarizes fundamental sonar theory and details calibration methods.
8. Multibeam Sonar Theory of Operation - a clear overview of sonar concepts (multibeam and sidescan)

Why map the ocean?

Most of this wiki focuses on *how* to map the watery 71% of our planet. Here are a few examples of *why*.

Beyond the critical role of safety of navigation, ocean mapping is important for a wide array of reasons:

1. confirming plate tectonics and ancient oceans
2. understanding ocean circulation and climate
3. studying historic tsunamis and present risks
4. managing fisheries and food sources
5. tracking sources of greenhouse gases
6. routing global submarine cables
7. catching up to maps of our moon and Mars

Ocean Mapping Community Wiki

https://github.com/oceanmapping/community/wiki

AMSA Symposium

Tim Ingleton,

NSW Department of Planning, Industry and Environment

AUS SEABED






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Steering Committee Elections

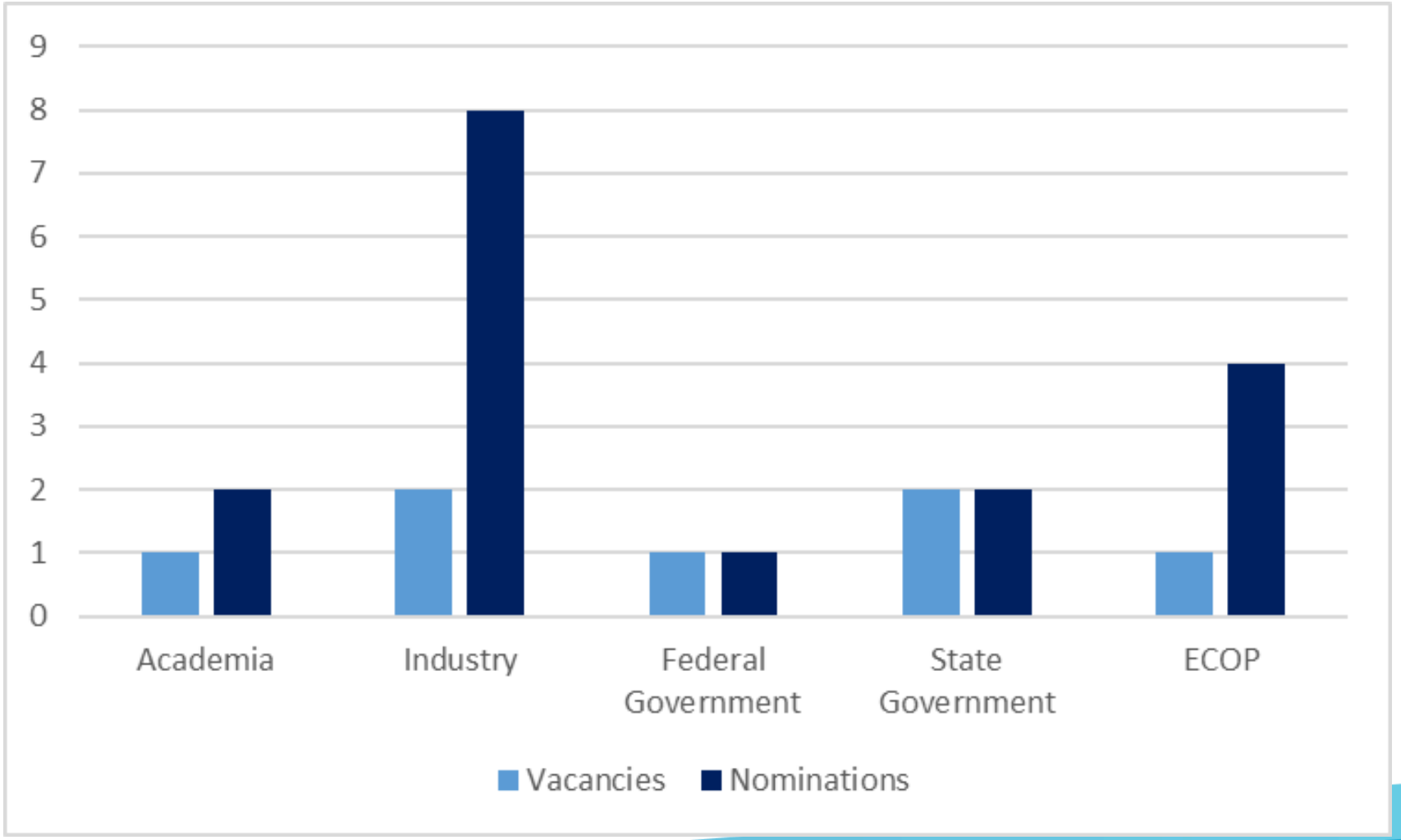
Aero Leplastrier

2023 Steering Committee memberships up for renewal

A number of organisations reached the end of their terms on the committee this year.

Sector	Early Career Ocean Professional	Academic	Industry	Industry	Federal	State Gov	State Gov
Member Organisation	Queensland University of Technology	Curtin University	IIC Technologies	Hydrographic and Cadastral Survey	Department of Agriculture, Water and Environment	South Australian Research Development Institute	New South Wales Department of Planning and Environment
Organisation representative							
	Mardi McNeil	Iain Parnum	David Crossman (Deputy Chair)	Richard Cullen	Cath Sampson	Mark Doubell	Tim Ingleton

Nomination details



2023 Steering Committee Renewal – Returning Organisations

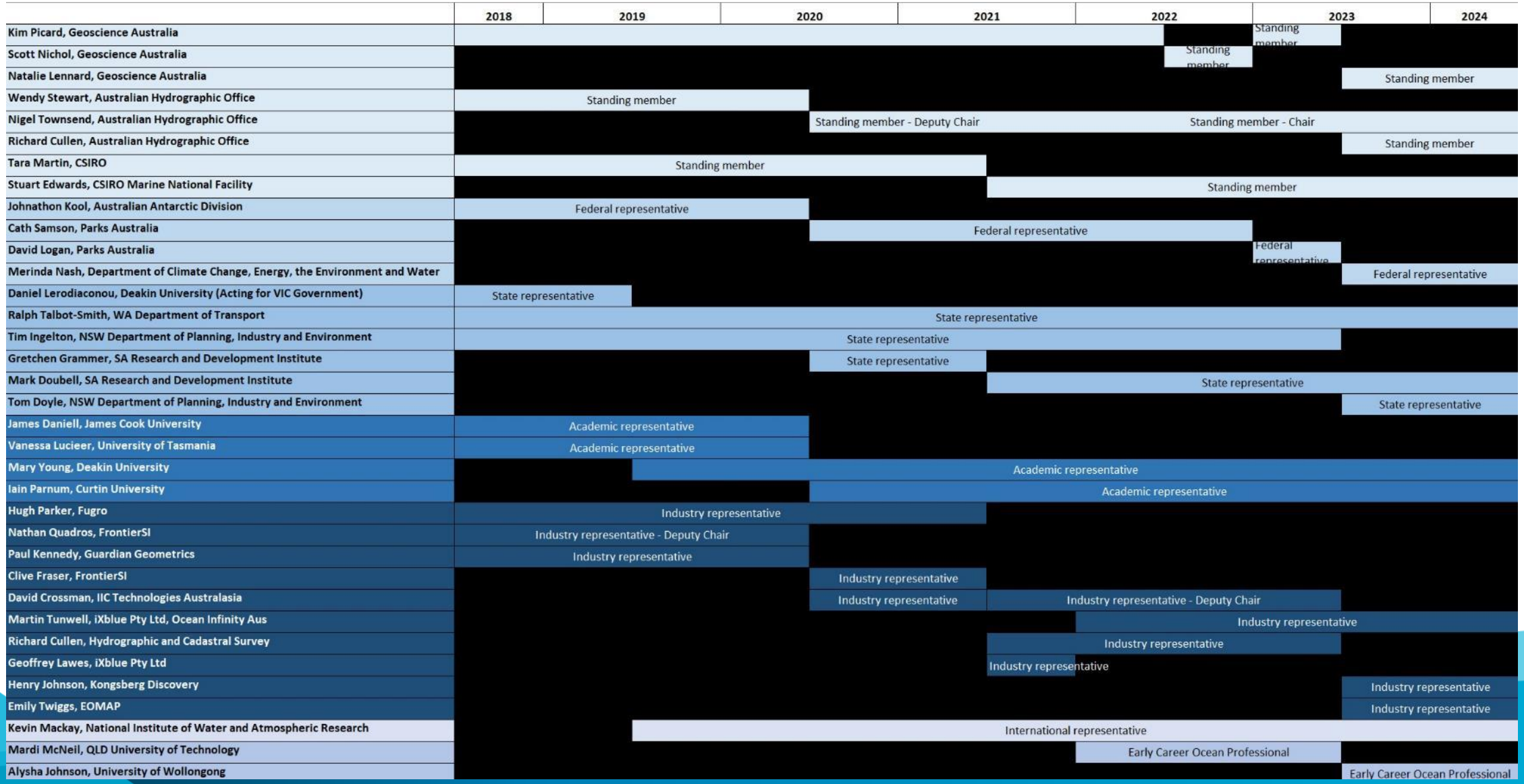
Sector	**Academic**	**Federal**		**State Gov**	**State Gov**
Member Organisation	Curtin University	Department of Climate Change, Energy, the Environment and Water	Parks Australia	New South Wales Department of Planning, and Environment	South Australian Research Development Institute
			Environmental Data and Future Systems Section	Water, Wetlands and Coastal Science	
Organisation representative						
	Iain Parnum	Cath Sampson	Merinda Nash	Tim Ingleton	Tom Doyle	Mark Doubell

2023 Steering Committee Renewal – Incoming members

The following organisations and representatives are joining the SC for the first time

Sector	Early Career Ocean Professional	Industry	Industry
Member Organisation	University of Wollongong	EOMAP	Kongsberg Discovery
Organisation representative			
	Alysha Johnson	Emily Twiggs	Henry Johnson

Steering Committee membership history



AusSeabed Workplan Overview 23/24

Kim Picard,

Geoscience Australia

Steps towards achieving our 2025 roadmap … 2030

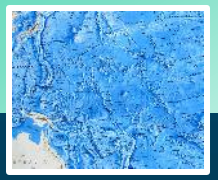
Preparation for scaling

2030 AusBathyTopo Series

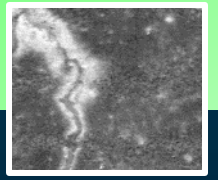
National Seabed Mapping Plan

Data Modernisation

Boosting International Engagement



Backscatter Product Initiation

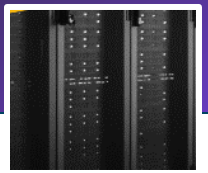


Governance and Operations

Steps towards achieving our 2025 roadmap … 2030

Preparation for scaling

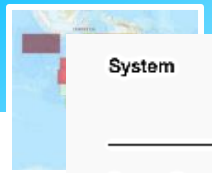
2 yrs



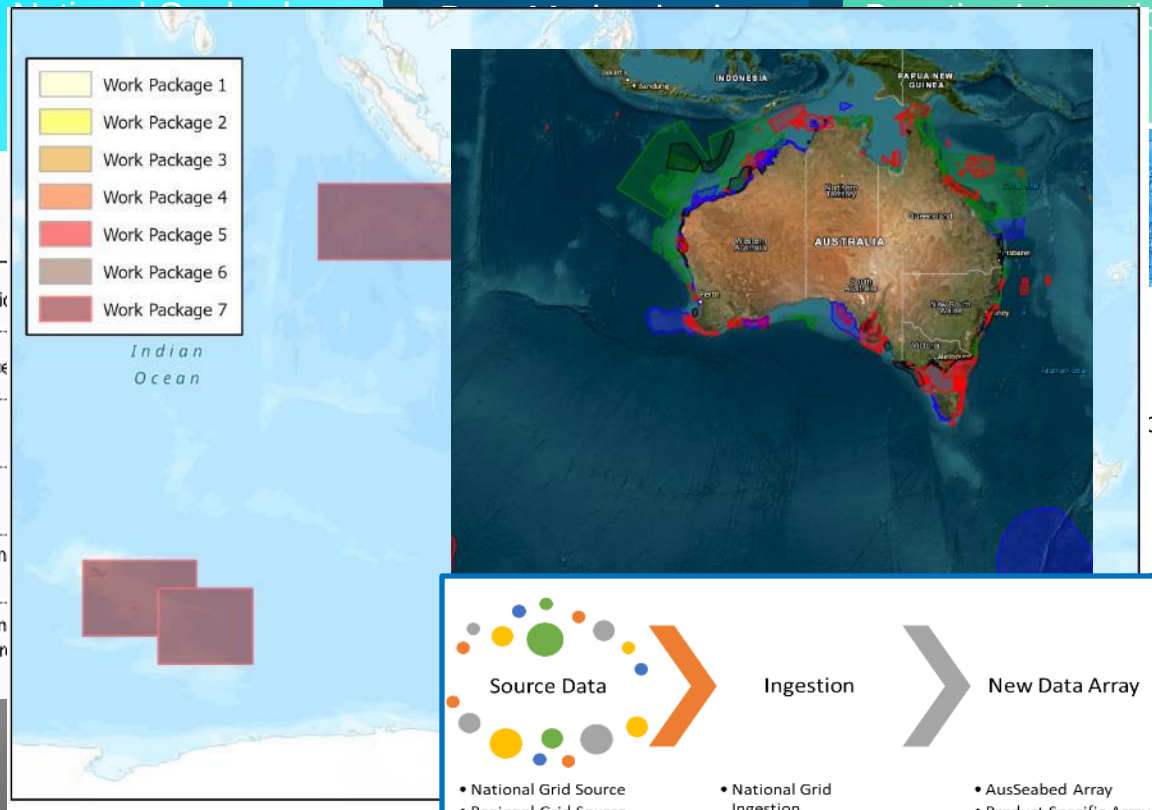
- Services with clear lines of responsibility & plan
- Tools with seamless experience for all users

2030 AusBathyTopo Series

7 yrs

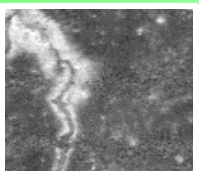


- Regional series current Nationa
- MBES backlog
- Data coverage production line



Backscatter Product Initiation

1 yr



- Product specs and guidelines
- New backscatter product published

BENEFITS

Increased infrastructure sustainability

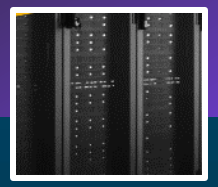
Improve services to the community

Improve decision- areas of high gov

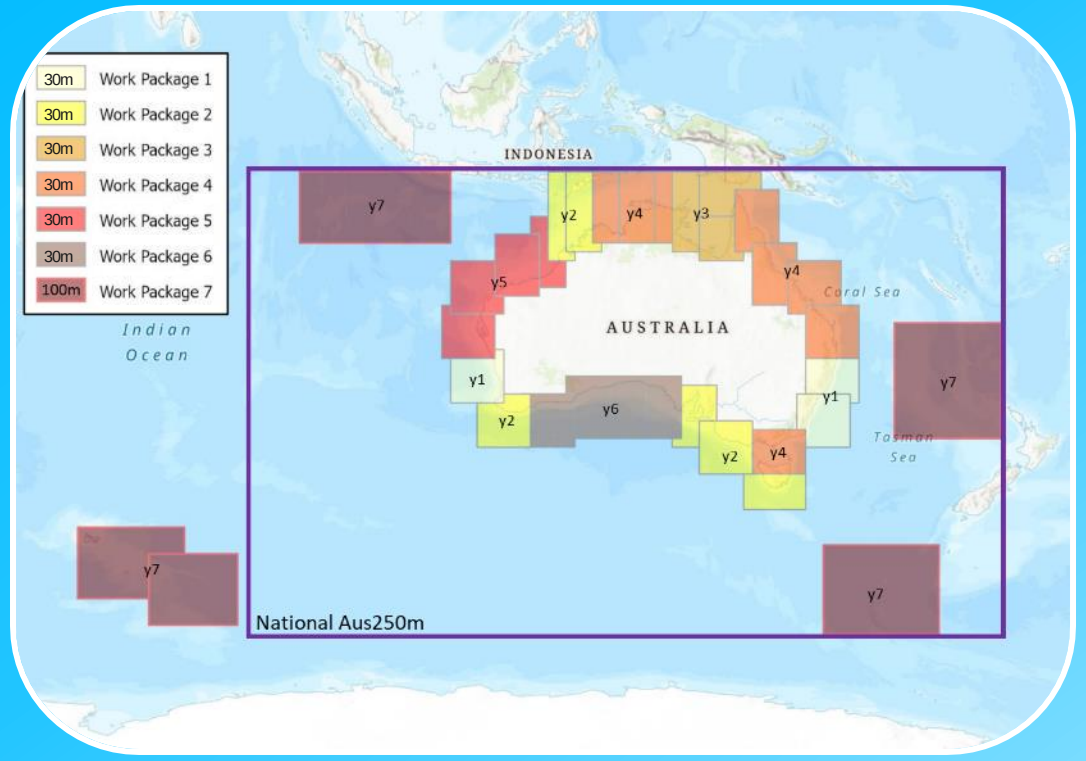
Efficiency-gain th stop-shop & strategic alignement

Aligning and optimising our efforts

Preparation for scaling



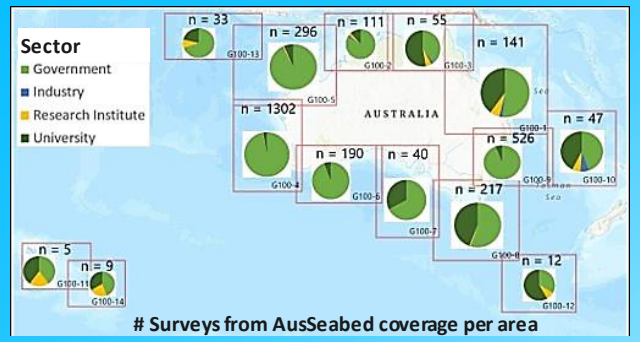
Bathymetry Grid Series by 2030



Data Custodianship Modernisation

Aligning

- Data partners
- Contributing Hubs



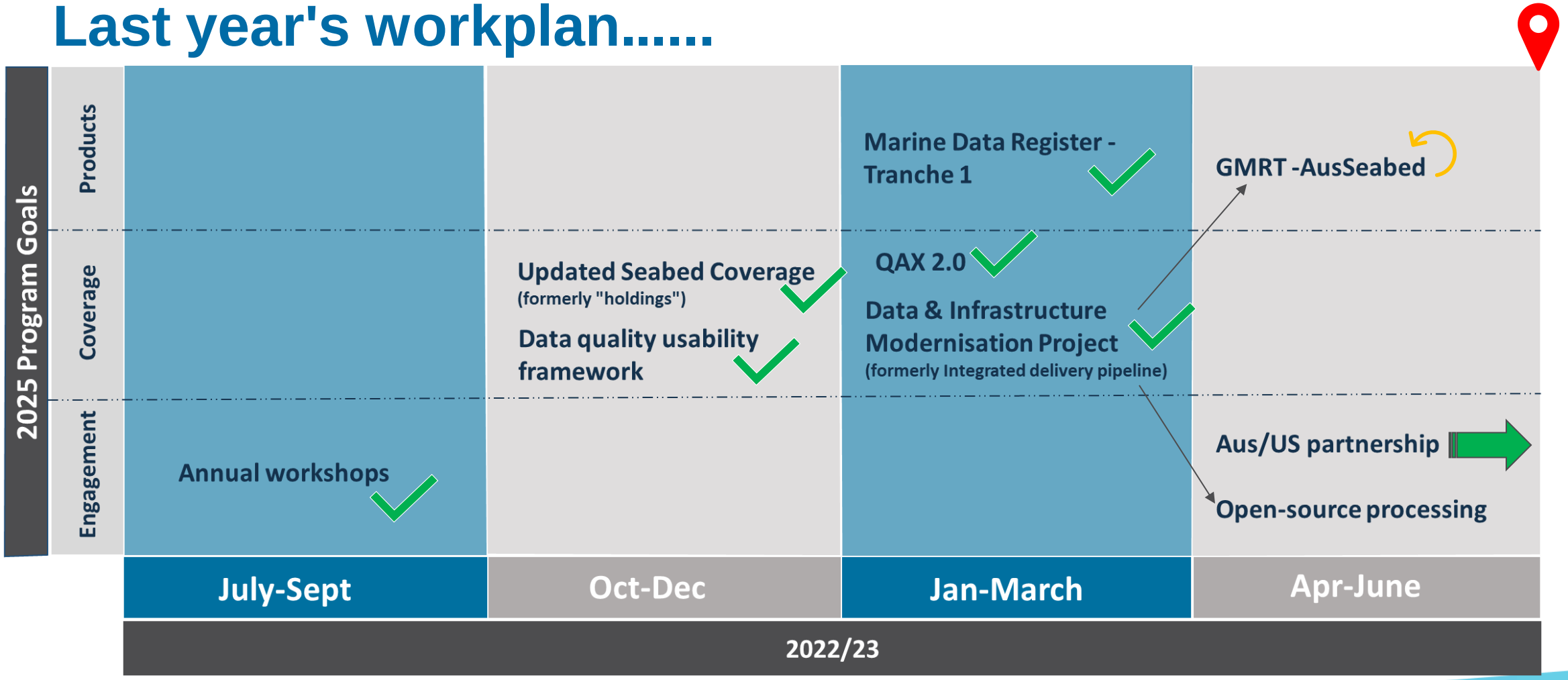
National Seabed Mapping Plan

Program Increment – The Next Quarter

Natalie Lennard,

Geoscience Australia

Last year's workplan.....



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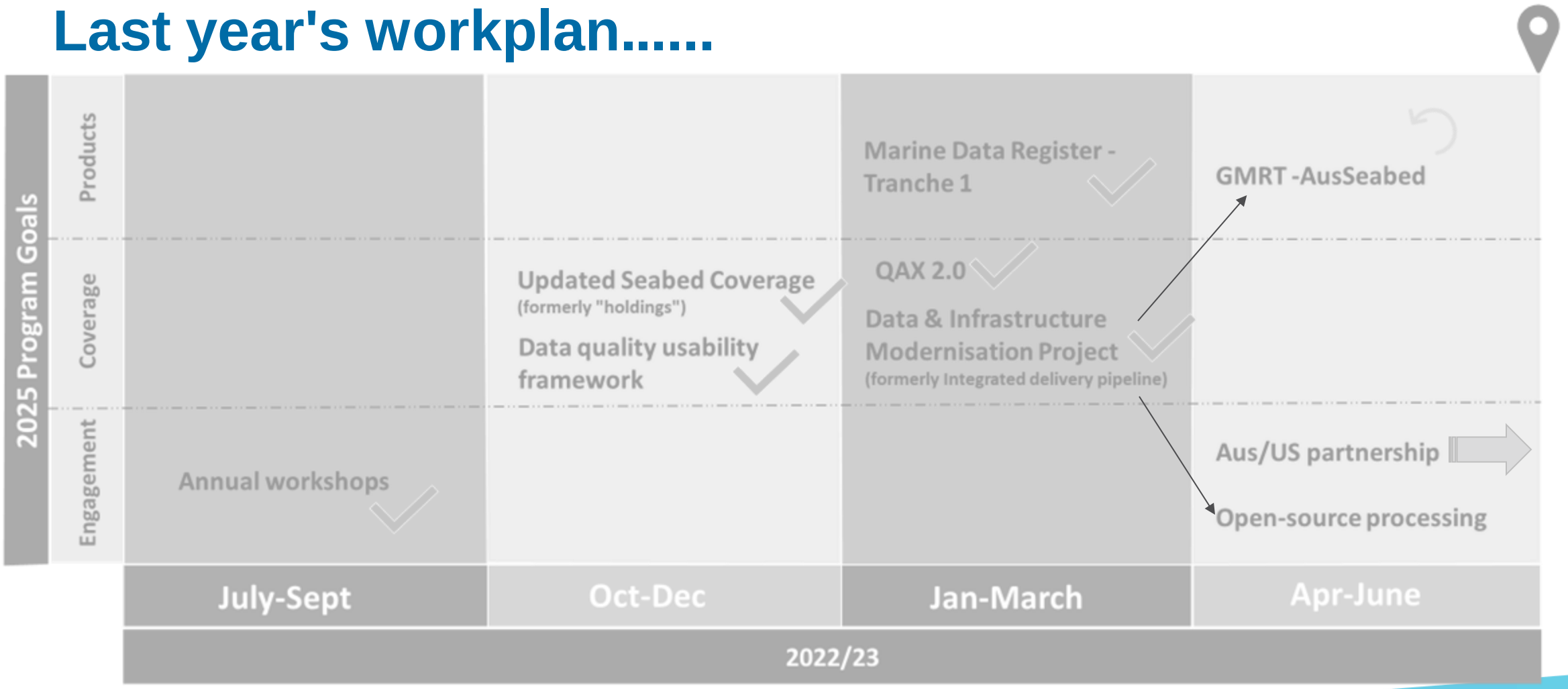

The next quarter

Governance	• Annual Reporting • Work planning • Steering Committee – 27/7/23 • Executive Board – 14/8/23 • Recruitment
Preparation for Scaling	• Geoserver Replacement • Marine Data Register – security and data migration
2030 AusBathyTopo Series	• Communications • Recruitment • Prioritisation of Data • GA/AHO Licences definition • Processing insourcing
National Seabed Mapping Plan	• June Workshop Report • Quality Framework • QAX Scoping • Reporting Framework for Sufficiently Mapped Seafloor
Data Modernisation	• Project Initiation • Data Analysis and design commencement

For later.....

- Backscatter Product Initiation
- International Engagement

AUS SEABED

Special thanks to our departing Program Director

Kim Picard

Thankyou

Contact us

Ausseabed@ga.gov.au
www.ausseabed.gov.au